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ABSTRACT

This obtrusive post-hoc quasi-experimental study investigated Scholastic Assessment Test (SAT) scores of 111 high school students in grades 10 through 12. Fifty-three students were enrolled in at least one Advanced Placement (AP) course at the time of the study. General factorial analysis of variance (ANOVA) tested for significant differences between verbal, quantitative, and composite SAT scores with the independent variables of class enrollment (AP, non-AP), economic level (high EL, low EL), and gender. Economic level depended on student qualification for the National School Lunch Program. Analysis of the data indicated that there were significantly higher verbal ($p=0.001$), quantitative ($p=0.038$), and composite ($p=0.003$) SAT scores for students enrolled in the AP program. In addition, ANOVA of two-way interaction between class enrollment and economic level indicated that high EL students enrolled in the AP program had significantly higher quantitative SAT scores ($p=0.019$). All other variable interactions produced no significant differences, although females did have higher scores than males. (Contains 21 tables and 13 references.) (Author/SLD)

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Title: THE IMPACT OF ADVANCED PLACEMENT COURSES ON HIGH SCHOOL STUDENTS TAKING THE SCHOLASTIC APTITUDE TEST

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THE IMPACT OF ADVANCED PLACEMENT COURSES ON HIGH SCHOOL STUDENTS TAKING THE SCHOLASTIC APTITUDE TEST

By

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ABSTRACT

This obtrusive post-hoc quasi-experimental study investigated Scholastic Aptitude Test (SAT) scores of grade 10-12 high school Advanced Placement (AP) students. One hundred eleven students participated in the study. General factorial analysis of variance (ANOVA) tested for significant differences between verbal, quantitative, and composite SAT scores with the independent variables of class enrollment (AP, Non AP), economic level (High EL, Low EL), and gender. For class enrollment, students must be in at least one AP course. Fifty-three students met this criterion. Economic level depended upon student qualification for the National School Lunch Program. Analyzed data indicated that there were significantly higher verbal ($p=.001$), quantitative ($p=.038$), and composite ($p=.003$) SAT scores for students enrolled in the AP program. In addition, ANOVA of 2-way interaction between class enrollment and economic level indicated that High EL students enrolled in the AP program had significantly higher quantitative SAT scores ($p=.019$). all other variable interactions produced no significant differences ($p=>.05$); however, females had higher mean scores than males.

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INTRODUCTION

Advanced Placement (AP) programs have increased substantially over the past 4 decades. The original purpose of the AP program, initiated in 1955 by the College Board, was to provide college credit to a few academically talented high school students. During the first year of the program, only 1,200 AP examinations were administered (Steller & Lambert, 1996). Today, the primary objective of the program is to provide high schools with a challenging college preparatory program that will effectively prepare a broad range of high school students for college level academics. In 1998, more than a million AP examinations were administered to about 500,000 high school students representing high schools across the United States (College Board Online, 1998). There are now 32 different subject areas, offered by approximately 14,000 high schools worldwide (College Board Online, 1998).

The courses, which are guided by the College Board, have permitted the highly skilled motivators to strengthen and refine their academic proficiency and expertise for the challenging AP examinations (Davis, 1996). This is also a teacher-driven program, which allows students to pay the price to compete with the best and brightest students across the United States, as well as around the world. If teachers are properly trained and motivated, this program not only saves parents tuition costs and student's academic time, but it also strengthens high school curricula. In addition to these advantages, the program may offer other benefits as well. According to the 1995 College Board Bulletin, these benefits include:

- Opportunities to sharpen academic skills, allowing students to enter college with the confidence that they can succeed;
- Exemptions by most colleges and universities from introductory courses and permission to take higher-level courses, enabling students to move ahead in areas of interest;
- Opportunities to demonstrate to colleges a students' willingness to tackle more difficult courses;
- Time allotted to explore subject areas, as well as time to pursue internships or to study abroad;
- Opportunities to set a challenge for students and experience the satisfaction of meeting that challenge;
- Eligibility for honors and other special programs open to students who have received AP recognition; and
- No-risk obligation, meaning students control the reporting of their own AP grades.

Although the AP program is open to all students, it is recommended that only students who have studied beyond the normal secondary school level take the AP examinations. These exams are offered on a voluntary basis to high school students annually, giving them an opportunity to demonstrate college-level attainment. In order to receive college credit and/or placement for the courses, students are required to take AP exams prepared by the Educational Testing Service (ETS). The exams consist of a multiple-choice section and a free-response section. The results of the 2 sections are combined together to determine a composite score and then converted to a 5-point scale. The scoring is as follows: 5 is extremely well qualified; 4, well qualified; 3, qualified; 2,

possibly qualified; and 1, no recommendation (Melican, Debebe, & Morgan, 1997). Students scoring a 3 or higher on an AP examination usually receive college credit. Stellar & Lambert, (1996) also indicate that a student's grade on the AP examination is "curved," meaning that the score is based on how well that student has done on the exam compared to the thousands of other students who took the same exam.

BACKGROUND AND SETTING

An important task of Texas education is to identify and respond to the many variations among people. In a typical AP course, teachers must focus primarily upon reinforcing advanced skills and drilling students to assure that they are prepared to pass the examination. Special needs deserve to be met and these gifted students should be encouraged to learn as fast as they can.

Indicators of what students have learned in school are perhaps the most important measures of the outcomes of education. Test scores and other information are an excellent indication of success. The criteria set is pertinent knowledge and has implications for schools and colleges, since the number of high school graduates who take the Scholastic Aptitude Test (SAT) is almost as large as the number of new freshmen at four-year colleges and universities. The number of students entering college with AP examination grades represents about one-fourth of that four-year college population, and includes 35,000 graduates qualified to enter as sophomores or juniors (College Board-Senior 98, 1998).

College Board (1998) also indicates that more than 320,000 AP students were seniors, with exceptional academic backgrounds, very high grades, and average SAT scores; however, average SAT scores of AP graduates are above the averages for the

SAT population at large, scoring at least 80 points above the national average. According to The College Board (1995), colleges are well aware, as studies show, that AP students, when compared to non-AP students, are better prepared academically on all college admission measures of ability and achievement. They are more likely to specialize in majors with tougher grading standards, complete more course work and take a greater number of higher-level courses. They should be able to perform significantly better over 4 years in their course work. They also have greater chances to be successful in terms of leadership and significant accomplishments, graduate with a double major, and they will be twice as likely to go into advanced study such as Ph.D. programs, medicine, and law.

STATEMENT OF THE PROBLEM

The problem this study will be addressing is the impact of the AP Program for students who take college entrance examinations.

RESEARCH QUESTION

How do SAT scores for students who take AP courses compare to those who are enrolled in regular high school courses?

Hypothesis: There will be no significant differences in SAT scores for AP students compared to Non-AP students.

BENEFITS OF THE STUDY

1. To determine whether or not AP students score higher on the SAT.

REVIEW OF THE LITERATURE

This chapter presents an evaluation of the literature that is pertinent to Advanced Placement courses and the Scholastic Aptitude Test. It is composed of theory, practice, and research that deal with this matter.

THEORY

From the mid-1950's to the present, secondary schools have generally encouraged academically capable students to take heavy course schedules, primarily to provide them with an intellectual challenge and to permit them to accelerate through required course work (Wilbur & Chapman, 1978). However, such programming has not been without certain drawbacks. Students, for example, may enter their senior year with few, if any course requirements left to complete, and, although they can enroll in electives and other activities that may interest them, many do not. Instead, they may spend most of their senior year idly marking time while looking forward to college.

In recent years, most states have made educational reform a primary focus for their attention and resources. By responding to the needs of more advanced learners, high schools have added courses that once were strictly the domain of the university. The Advanced Placement (AP) program of The College Board is a principal part of this focus. Increasingly, AP is recognized as a quality program that provides opportunities for students to excel. These students are from diverse economic backgrounds and ethnic groups.

It is not only necessary to prepare students for college, but also to motivate and inspire them. The exposure to college-level courses, while in high school, may

strengthen the students self-confidence, enabling them to possibly meet the demands of college. According to Arobolino, Arriaga, Bonner, Clarke, Galloway, Janzen, Reed, Senzee, Smith, Solomon, and Warren (1996), AP may offer students:

- College credits for courses and examinations successfully taken in high school,
- Exemptions from some introductory college courses, thus permitting them to move more quickly into advanced classes,
- A motivation to attempt more challenging courses in both high school and college,
- To develop, in a high school environment, the study skills and habits they will need in college,
- To bolster their confidence so that they can meet college requirements, and
- To reduce college costs and time to obtain a degree.

PRACTICE

In the early 1950's, the idea of advanced college placement was introduced by two programs: the Kenyon Plan, and a study between 3 universities and 3 secondary schools. This study grew to a team of 12 universities and high schools, as did the organization, to develop examinations for the AP courses. In the spring of 1954, the first AP examinations were administered to 28 different high schools (Arbolino et al., 1996).

In a typical AP course, non-gifted students possess such a vast range of educational backgrounds, innate abilities, and intellectual capacities that an AP teacher must focus primarily upon reinforcing advanced skills and drilling students to assure that they are prepared to pass the examination. The teacher of such a course finds in the AP program a structured set of skills and academic challenges that can raise students' critical reading, writing, and thinking skills dramatically (Davis, 1996).

RESEARCH

It has been reported that students who take more academic courses do significantly better on both SAT and AP tests (Chenowith, 1996). Chenowith also reports that this is true not only for all students, but appears to be true for minorities, particularly African-Americans. These results also suggest that 41% of the students taking the SAT have taken 20 or more year-long academic courses in high school.

In 1997, the 1.1 million students who took the widely used college entrance examinations scored a mean of 511 on the mathematics section of the College Board's reasoning test (Honan, 1997). Minority students made up 32% of the test takers, while female students have substantially increased their population of test takers.

From 1967 to 1995, the mean mathematics score for males has been at least 40 points greater than the female mean score (Tate, 1997). As these female students are improving their scores, they gain two points to every male's three points on the mathematics section of the SAT (Honan, 1997). However, Honan reports that both male and female students have maintained the same average scores on the verbal test.

The number of students taking AP exams has grown dramatically over the past ten years, ranging from 98,000 in 1978 to approximately 450,000 in 1994 (Bracey, 1995). Similar to the SAT population, the AP population is 59% female with growing ethnic diversities (Honan, 1997). During this time-period, participating African-American students tripled and participating Hispanic students quintupled (Chenowith, 1996). However, white students outperformed African-American and Hispanic students on all college entrance and AP examinations (Tate, 1997). Tate also reports that from 1990 to

1995, there was a positive relationship between students' reported family income level and the SAT mean scores.

A record of 32,000 students qualified to enter college in the fall of 1997 as sophomores or juniors on the basis of the credit they received through the AP examinations (Honan, 1997). As the number of participants in the AP program increase, the courses students are taking may have a strong association to the proportion of students scoring above 650 on the mathematics section of the SAT, reaching an all-time high in 1993 (Bracey, 1995).

Research on the effects of taking AP courses has demonstrated that when AP students reach college, they typically take additional courses in the academic areas of their AP courses, enroll in more courses than their peers, achieve higher grade-point averages, graduate with double majors, and go on to graduate school at a rate double that of their Non-AP peers (Arbolino et al., 1996)

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METHODOLOGY

INTRODUCTION

This chapter presents the research methodology used in resolving the research question. The chapter is composed of the introduction, restatement of the problem, restatement of the research question, study design, definition of terms, assumptions, delimitations, limitations, study subjects, instrumentation and data collection, null hypotheses, and data analysis.

RESTATEMENT OF THE PROBLEM

The problem this study addressed is the impact of the Advanced Placement (AP) Program for students who take college entrance examinations. The major purpose of the research project was to investigate and compare Scholastic Aptitude Test (SAT) scores for students taking AP and Non-AP courses at a South Texas High School.

RESTATEMENT OF THE RESEARCH QUESTION

The proposed question of the study is as follows:

How do SAT scores for students who take AP courses compare to those who are enrolled in regular high school courses?

STUDY DESIGN

The study was an obtrusive post-hoc hypotheses-testing quasi-experimental design. Study variables included: The 1998 SAT results from students in 10$^{th.}$ 11$^{th.}$ and 12th grades at Foy H. Moody High School in the Corpus Christi Independent School District. Variables designated by the design as independent are AP enrollment, Non-AP

enrollment, economic level, and gender. Variables designated by the design as dependent are the SAT examination results.

DEFINITION OF TERMS

Advanced Placement

The Advanced Placement (AP) Program is a cooperative educational endeavor between secondary schools and colleges and universities. It allows high school students to undertake college-level academic learning in AP courses, and gives them the opportunity to show that they have mastered the advanced material by taking standardized AP Exams (The College Board, 1996).

Non-Advanced Placement

Non-Advanced Placement (Non-AP) relates to those who are not enrolled in AP Program courses.

Scholastic Aptitude Test

Scholastic Aptitude Test (SAT) is a 7-sectioned, timed, standardized test that attempts to predict college performance. It measures verbal and mathematical reasoning abilities, which may develop over time. The two scores, ranging from a minimum of 200 to a maximum of 800, are added together to make one composite score. These scores are compared each year with other students nationwide who have also taken the test.

Economic Level

Economic level (EL) will be determined based on student qualification for the National School Lunch Program, School Breakfast Program. High EL is a distinction of economic level for students that do not qualify and Low EL is a distinction of economic

level for students that do qualify. Qualification is based on household size compared with annual income.

ASSUMPTIONS

1. It was assumed that all data and records are correct, accurately recorded, and maintained. Individualized contacts facilitated the data collection process, eliminating data transfer complications.
2. It was assumed that the data collected via random sampling was representative of the study population.
3. It was assumed that measures are valid and reliable.

DELIMITATIONS

This study took place in the state of Texas. The data was limited to a school in the South Texas region that currently has implemented an AP program. Study subjects must have taken the SAT examination as a student of the participating school to be a member of the study.

LIMITATIONS

Study results were limited to the participating school and may have meaning to like schools. The research methodology employed may be applicable for different schools studying this issue.

STUDY SUBJECTS

The study population was students in a school that participate in an AP Curriculum in the South Texas region. One hundred eleven students participated in the obtrusive study. There was a stratified random sampling of the data.

INSTRUMENTATION & DATA COLLECTION

The instrument gathered the following information on each student chosen through the selection process:

- Verbal Scholastic Aptitude Test scores,
- Quantitative Scholastic Aptitude Test scores,
- Composite Scholastic Aptitude Test scores,
- Status of enrollment in Advanced Placement courses
- Economic Level, and
- Gender.

NULL HYPOTHESES

The research question generated the following hypotheses:

- ***Ho1:*** There will be no significant differences in verbal SAT scores for AP students as compared to Non-AP students.
- ***Ho2:*** There will be no significant differences in quantitative SAT scores for AP students as compared to Non-AP students.
- ***Ho3:*** There will be no significant differences in composite SAT scores for AP students as compared to Non-AP students.
- ***Ho4:*** There will be no significant differences in verbal SAT scores for students based on economic level.
- ***Ho5:*** There will be no significant differences in quantitative SAT scores for students based on economic level.
- ***Ho6:*** There will be no significant differences in composite SAT scores for students based on economic level.

- ***Ho7:*** There will be no significant differences in verbal SAT scores for students based on gender.
- ***Ho8:*** There will be no significant differences in quantitative SAT scores for students based on gender.
- ***Ho9:*** There will be no significant differences in composite SAT scores for students based on gender.
- ***Ho10:*** There will be no significant differences in the 2-way interaction between verbal SAT scores and student enrollment and economic level.
- ***Ho11:*** There will be no significant differences in the 2-way interaction between quantitative SAT scores and student enrollment and economic level.
- ***Ho12:*** There will be no significant differences in the 2-way interaction between composite SAT scores and student enrollment and economic level.
- ***Ho13:*** There will be no significant differences in the 2-way interaction between verbal SAT scores and student enrollment and gender.
- ***Ho14:*** There will be no significant differences in the 2-way interaction between quantitative SAT scores and student enrollment and gender.
- ***Ho15:*** There will be no significant differences in the 2-way interaction between composite SAT scores and student enrollment and gender.
- ***Ho16:*** There will be no significant differences in the 2-way interaction between verbal SAT scores and economic level and gender.
- ***Ho17:*** There will be no significant differences in the 2-way interaction between quantitative SAT scores and economic level and gender.

- ***Ho18:*** There will be no significant differences in the 2-way interaction between composite SAT scores and economic level and gender.
- ***Ho19:*** There will be no significant differences in the 3-way interaction between verbal SAT scores and student enrollment, economic level, and gender.
- ***Ho20:*** There will be no significant differences in the 3-way interaction between quantitative SAT scores and student enrollment, economic level, and gender.
- ***Ho21:*** There will be no significant differences in the 3-way interaction between composite SAT scores and student enrollment, economic level, and gender.

DATA ANALYSIS

The research question and hypotheses as appropriate determined the data analysis. The null hypotheses were analyzed with the Statistical Package for the Social Sciences (SPSS) to test for significant differences. General factorial analysis of variance (ANOVA) was used for the calculation with the alpha level of .05 as the criterion for accepting or rejecting the hypotheses. A descriptive analysis of all independent and dependent variables in the study is presented. This report will include means, standard deviations, and range of scores for each of the variables. These are reported in tabular format in Chapter 4.

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RESULTS

Analysis of all independent and dependent variables in the study are presented in this chapter. The analysis includes means (0), standard deviations (SD), range of scores, and probability values (P). The general factorial analysis of variance (ANOVA) from the Statistical Package for the Social Sciences (SPSS) was used for the calculation, and the alpha level of .05 was selected as the criterion.

Table 1. General factorial ANOVA results of verbal SAT scores for AP and Non AP students.

ENROLLMENT	0	SD	RANGE	P
AP	460.19	93.82	200-760	.001
Non AP	400.52	82.45		
Total	428.04	92.78		

Based on results presented in Table 1, the null hypothesis that there will be no significant difference in verbal SAT scores between AP and Non AP students was rejected (f=12.34, df=1/2, p=.001). Therefore, students enrolled in AP courses received significantly higher verbal SAT scores than Non AP students.

Table 2. General factorial ANOVA results of quantitative SAT scores for AP and Non AP students.

ENROLLMENT	0	SD	RANGE	P
AP	460.00	86.78	210-680	.038
Non AP	422.77	93.19		
Total	440.00	93.05		

Based on results presented in Table 2, the null hypothesis that there will be no significant difference in quantitative SAT scores between AP and Non AP students was rejected (f=4.42, df=1/2, p=.038). Therefore, students enrolled in AP courses received significantly higher quantitative SAT scores than Non AP students.

Table 3. General factorial ANOVA results of composite SAT scores for AP and Non AP students.

ENROLLMENT	0	SD	RANGE	P
AP	920.19	167.02	470-1400	.003
Non AP	823.28	165.15		
Total	868.28	172.26		

Based on results presented in Table 3, the null hypothesis that there will be no significant difference in composite SAT scores between AP and Non AP students was rejected (f=9.23, df=1/2, p=.003). Therefore, students enrolled in AP courses received significantly higher composite SAT scores than Non AP students.

Table 4. General factorial ANOVA results of verbal SAT scores for students based on economic level.

ECONOMIC LEVEL	0	SD	RANGE	P
High	432.03	103.89	200-760	.495
Low	423.65	80.15		
Total	428.04	92.78		

Based on results presented in Table 4, the null hypothesis that there will be no significant difference in verbal SAT scores between High EL and Low EL students was accepted (f=.468, df=1/2, p=.495).

Table 5. General factorial ANOVA results of quantitative SAT scores for students based on economic level.

ECONOMIC LEVEL	0	SD	RANGE	P
High	446.78	106.76	210-680	.373
Low EL	433.46	75.59		
Total	440.00	93.05		

Based on results presented in Table 5, the null hypothesis that there will be no significant difference in quantitative SAT scores between High EL and Low EL students was accepted (f=.801, df=1/2, p=.373).

Table 6. General factorial ANOVA results of composite SAT scores for students based on economic level.

ECONOMIC LEVEL	0	SD	RANGE	P
High	878.82	196.75	470-1400	.393
Low	857.12	142.17		
Total	868.04	172.26		

Based on results presented in Table 6, the null hypothesis that there will be no significant difference in composite SAT scores between High El and Low EL students was accepted (f=.735, df=1/2, p=.393).

Table 7. General factorial ANOVA results of verbal SAT scores for students based on gender.

GENDER	0	SD	RANGE	P
Male	415.38	95.43	200-760	.673
Female	439.00	89.78		
Total	428.04	92.78		

Based on results presented in Table 7, the null hypothesis that there will be no significant difference in verbal SAT scores between male and female students was accepted (f=.179, df=1/2, p=.673).

Table 8. General factorial ANOVA results of quantitative SAT scores for students based on gender.

GENDER	0	SD	RANGE	P
Male	436.73	97.39	210-680	.839
Female	442.83	89.84		
Total	440.00	93.05		

Based on results presented in Table 8, the null hypothesis that there will be no significant difference in quantitative SAT scores between male and female students was accepted (f=.042, df=1/2, p=.839).

Table 9. General factorial ANOVA results of composite SAT scores for students based on gender.

GENDER	0	SD	RANGE	P
Male	852.12	177.25	470-1400	.908
Female	881.83	168.08		
Total	868.04	172.26		

Based on results presented in Table 9, the null hypothesis that there will be no significant difference in composite SAT scores between male and female students was accepted (f=.014, df=1/2, p=.908).

Table 10. General factorial ANOVA results of 2-way interaction of verbal SAT scores between student enrollment (AP, Non AP) and economic level (High EL, Low EL).

ENROLLMENT	ECONOMIC LEVEL	0	P
AP	High EL	478.85	.313
	Low EL	442.22	
	Total	460.19	
Non AP	High EL	395.15	
	Low EL	407.08	
	Total	400.17	

Based on results presented in Table 10, the null hypothesis that there will be no significant difference in verbal SAT scores between AP and Non AP students based on economic level was accepted (f=1.029, df=1/2, p=.313).

Table 11. General factorial ANOVA results of 2-way interaction of quantitative SAT scores between student enrollment (AP, Non AP) and economic level (High EL, Low EL).

ENROLLMENT	ECONOMIC LEVEL	0	P
AP	High EL	490.77	.019
	Low EL	430.37	
	Total	460.00	
Non AP	High EL	412.12	
	Low EL	439.17	
	Total	423.51	

Based on results presented in Table 11, the null hypothesis that there will be no significant difference in quantitative SAT scores between AP and Non AP students based on economic level was rejected (f=5.73, df=1/2, p=.019). Therefore, High EL students enrolled in the AP program had significantly higher quantitative SAT scores.

Table 12. General factorial ANOVA results of 2-way interaction of composite SAT scores between student enrollment (AP, Non AP) and economic level (High EL, Low EL).

ENROLLMENT	ECONOMIC LEVEL	0	P
AP	High EL	969.62	.067
	Low EL	872.59	
	Total	920.19	
Non AP	High EL	807.27	
	Low EL	846.25	
	Total	823.68	

Based on results presented in Table 12, the null hypothesis that there will be no significant difference in composite SAT scores between AP and Non AP students based on economic level was accepted (f=3.44, df=1/2, p=.067).

Table 13. General factorial ANOVA results of 2-way interaction of verbal SAT scores between student enrollment (AP, Non AP) and gender (male, female).

GENDER	ENROLLMENT	0	P
Male	AP	460.00	.815
	Non AP	398.95	
	Total	415.38	
Female	AP	460.26	
	Non AP	403.50	
	Total	441.02	

Based on results presented in Table 13, the null hypothesis that there will be no significant difference in verbal SAT scores between AP and Non AP students based on gender was accepted (f=.055, df=1/2, p=.815).

Table 14. General factorial ANOVA results of 2-way interaction of quantitative SAT scores between student enrollment (AP, Non AP) and gender (male, female).

GENDER	ENROLLMENT	0	P
Male	AP	463.57	.274
	Non AP	426.84	
	Total	436.73	
Female	AP	458.72	
	Non AP	415.00	
	Total	443.90	

Based on results presented in Table 14, the null hypothesis that there will be no significant difference in quantitative SAT scores between AP and Non AP students based on gender was accepted (f=1.21, df=1/2, p=.274).

Table 15. General factorial ANOVA results of 2-way interaction of composite SAT scores between student enrollment (AP, Non AP) and gender (male, female).

GENDER	ENROLLMENT	0	P
Male	AP	923.57	.469
	Non AP	825.79	
	Total	852.12	
Female	AP	918.97	
	Non AP	818.50	
	Total	884.92	

Based on results presented in Table 15, the null hypothesis that there will be no significant difference in composite SAT scores between AP and Non AP students based on gender was accepted (f=.528, df=1/2, p=.469).

Table 16. General factorial ANOVA results of 2-way interaction of verbal SAT scores between economic level (High EL, Low EL) and gender (male, female).

ECONOMIC LEVEL	GENDER	0	P
High	Male	413.24	.483
	Female	463.64	
	Total	432.03	
Low	Male	420.71	
	Female	434.74	
	Total	423.65	

Based on results presented in Table 16, the null hypothesis that there will be no significant difference in verbal SAT scores between High EL and Low EL students based on gender was accepted (f=.495, df=1/2, p=.483).

Table 17. General factorial ANOVA results of 2-way interaction of quantitative SAT scores between economic level (High EL, Low EL) and gender (male, female).

ECONOMIC LEVEL	GENDER	0	P
High	Male	434.32	.823
	Female	467.73	
	Total	446.78	
Low	Male	447.14	
	Female	428.42	
	Total	433.46	

Based on results presented in Table 17, the null hypothesis that there will be no significant difference in quantitative SAT scores between High EL and Low EL students based on gender was accepted (f=.050, df=1/2, p=.823).

Table 18. General factorial ANOVA results of 2-way interaction of composite SAT scores between economic level (High EL, Low EL) and gender (male, female).

ECONOMIC LEVEL	GENDER	0	P
High	Male	847.57	.618
	Female	931.36	
	Total	878.81	
Low	Male	867.86	
	Female	853.16	
	Total	857.12	

Based on results presented in Table 18, the null hypothesis that there will be no significant difference in composite SAT scores between High EL and Low EL students based on gender was accepted (f=.251, df=1/2, p=.618).

Table 19. General factorial ANOVA results of 3-way interaction of verbal SAT scores between enrollment (AP, Non AP), economic level (High EL, Low EL) and gender (male, female).

AP	ECONOMIC LEVEL	GENDER	0	P
AP	High	Male	461.82	.797
		Female	491.33	
		Total	478.85	
	Low	Male	453.33	
		Female	440.83	
		Total	442.22	
	Total	Male	460.00	
		Female	460.26	
		Total	460.19	
Non AP	High	Male	392.69	
		Female	404.29	
		Total	395.15	
	Low	Male	411.82	
		Female	403.08	
		Total	407.08	
	Total	Male	398.38	
		Female	403.50	
		Total	400.18	

Based on results presented in Table 19, the null hypothesis that there will be no significant difference in verbal SAT scores between AP and Non AP students based on economic level and gender was accepted (f=.066, df=1/2, p=.797).

Table 20. General factorial ANOVA results of 3-way interaction of quantitative SAT scores between enrollment (AP, Non AP), economic level (High EL, Low EL) and gender (male, female).

AP	ECONOMIC LEVEL	GENDER	0	P
AP	High	Male	471.82	.604
		Female	504.67	
		Total	490.77	
	Low	Male	433.33	
		Female	430.00	
		Total	430.37	
	Total	Male	463.57	
		Female	458.72	
		Total	460.00	
Non AP	High	Male	418.46	
		Female	388.57	
		Total	412.12	
	Low	Male	450.91	
		Female	429.23	
		Total	439.17	
	Total	Male	428.11	
		Female	415.00	
		Total	423.51	

Based on results presented in Table 20, the null hypothesis that there will be no significant difference in quantitative SAT scores between AP and Non AP students based on economic level and gender was accepted (f=.270, df=1/2, p=.604).

Table 21. General factorial ANOVA results of 3-way interaction of composite SAT scores between enrollment (AP, Non AP), economic level (High EL, Low EL) and gender (male, female).

AP	ECONOMIC LEVEL	GENDER	0	P
AP	High	Male	933.64	.673
		Female	996.00	
		Total	969.62	
	Low	Male	886.67	
		Female	870.83	
		Total	872.59	
	Total	Male	923.57	
		Female	918.97	
		Total	920.19	
Non AP	High	Male	811.15	
		Female	792.86	
		Total	807.27	
	Low	Male	862.72	
		Female	832.31	
		Total	846.25	
	Total	Male	826.49	
		Female	818.50	
		Total	823.68	

Based on results presented in Table 21, the null hypothesis that there will be no significant difference in composite SAT scores between AP and Non AP students based on economic level and gender was accepted (f= .179, df=1/2, p=.673).

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

One hundred eleven students participated in this research project. Of those, 47.8% were enrolled in at least one AP course. The remaining 52.2% were categorized as Non AP students. Economically, 53.2% fit the High EL definition while 46.8% were marked as Low EL. Of the classifications already delineated, 46.4% were male and 53.6% were female. Based on a NCES (1997) report, these percentages are similar to those that took AP examinations in 1996 (43.9% and 56.1% for males and females, respectively). Based on the 21 hypotheses presented in Chapter III and subsequent data analysis in Chapter IV, 17 of those hypotheses were accepted while four of them were rejected. Tables 1, 2, 3, and 11 in Chapter IV portray the most significant findings of the study. First, students enrolled in an AP course(s) had significantly higher mean scores than Non AP students on the verbal and quantitative components as well as the composite SAT. Second, High EL students enrolled in an AP course(s) had significantly higher mean quantitative SAT scores.

RELEVANCE TO THE LITERATURE

There are a minimal number of studies that have examined the relationship between AP enrollment and SAT achievement. The primary intent of this study was to investigate this relationship and determine if AP students do achieve higher mean SAT scores. Comparisons with the current literature are made, and where possible corroborated or refuted.

Chenowith (1996) reported that students who take more academic courses do significantly better on both SAT and AP tests. Although academic course loads for

students in this study were not examined; AP students did score significantly higher on all components of the SAT. This may corroborate Chenwith's findings. Tate (1997) documented that there was a positive relationship between students' reported family income level and their SAT mean scores. Analysis of economic level's impact on mean SAT scores in this study produced the same positive significant relationship.

Although not significantly different in this study, females had higher mean scores on both verbal and quantitative SAT tests. This is in direct contrast to the findings of Tate (1997), which reported that males had higher average mean scores on quantitative SAT test and a 1995 CEEB study reporting that males had a 43 point higher mean composite SAT score. As previously noted, the difference was 29 points in favor of females.

The relationship between ethnicity, AP enrollment, and SAT scores was not examined in this study. This study had a 100% minority population, making such analysis impossible. After comparing verbal and quantitative SAT scores of the study participants with the national average, students in this study scored 39 points and 2 points higher, respectively (NCES, 1997).

RECOMMENDATIONS

Recommendations that may be made from this study includes, but are not limited to:

- Examine the intrinsic/extrinsic factors that make the High EL students perform significantly better.
- Examine the relationship, if any, between the number of AP courses enrolled in with SAT scores.

- Examine the relationship, if any, between ethnicity, AP enrollment, and SAT scores.
- Examine the relationship, if any, between grade level, AP enrollment, and SAT scores. This study had primarily 11th grade subjects. There were a few in 10th and 12th grade, but not enough to be statistically relevant.
- Examine the relationship, if any, between the number of "academic" courses AP and Non AP students are enrolled in and SAT scores.

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